NOAA FISHERIES

Southwest Fisheries Science Center

September 1, 2015

SWFSC Annual Guidance Memorandum for Fiscal Year 2016

Purpose

The Southwest Fisheries Science Center (SWFSC) Strategic Science Plan[i] describes our 5-year vision, research themes, and foci. This Annual Guidance Memo (AGM) outlines our actions in Fiscal Year 2016 (FY16) to execute the plan within the constraints of our budget. In prioritizing our future activities, the primary factors considered will be scientific merit and management needs as specified in mandates contained in the Magnuson-Stevens Reauthorization Act (MSRA), the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and the Antarctic Marine Living Resources Convention Act (AMLRCA). The prioritization must also follow congressional and agency direction[ii]; therefore it is our responsibility to allocate the funding we receive in a way that meets the nation's highest scientific needs to manage trust resources under the stewardship of NOAA Fisheries.

FY 14-15 in Review

Our FY14-15 targets[iii] were successful in many ways. We identified three Focal Areas consistent with our Strategic Science Plan and were able to make advances in each:

California Current Ecosystem (CCE) Monitoring. The warm North Pacific (accompanied by the recent arrival of a weak El Niño[iv] and a possible onset of a positive phase of the Pacific Decadal Oscillation – PDO), the sighting of unusual species in the CCE, and the near historic drought affecting California's watershed resulted in a series of unusual conditions these past 18 months that have made headlines nationally[v]. We completed annual and biennial surveys of the California Current Large Marine Ecosystem (CCLME) working in collaboration with the NWFSC, academic, and Mexican and Canadian partners, and we completed the first west coast Cetacean and Ecosystem Assessment survey (CalCURCEAS[vi]) in six years. Overall we spent 365 days at sea, many more days in the field on land, and were able to collect much needed information on fisheries components such as Coastal Pelagic Species (CPS), Highly Migratory Species (HMS), rockfish and salmon; higher trophic components (e.g., marine mammals, turtles and seabirds); and supporting ecosystem components (e.g., primary and secondary production and abiotic variables).

Ecosystem Science. We continue in our role in furthering ecosystem science through systematic and strategic approaches to fisheries and protected species programs. Our analyses in the CCE and the CA watershed resulted in a successful Phase III of the California Current Integrated Ecosystem Assessment (CCIEA[vii]) in collaboration with our colleagues in the NWFSC. The CCIEA brought together the status and trends of ecological indicators, oceanographic, climatic, and anthropogenic drivers and pressures, and risk assessments at sub- and regional scales of the California Current. We also maintained for the 28th year our time series in the Antarctic as part of our lead science role in the U.S. Antarctic Marine Living Resources Program (AMLR). Our work in AMLR enabled us to provide best

science information available to continued discussions on management of the Antarctic krill fishery and the establishment of Marine Protected Areas in the Southern Ocean[viii].

Technology Development and Field Sampling Innovation. Building on our strengths in developing new and innovative uses of sampling technologies, we successfully initiated a UAS (Unmanned Aircraft Systems) Program that includes training in-house at the La Jolla Lab as well as deployments in the field in the US, Canada, Chile and the Antarctic. We also took some of our acoustic methods and sensors to the Central Valley where we have begun working on approaches to sample and survey salmon predators in riverine environments. Moving CoastWatch and our data access functions to our Santa Cruz Lab hasallowed enhanced and expanded services and data access capabilities. SWFSC's Environmental Research Division's Data Access Program (ERDDAP) is included in the NOAA Data Access Procedural Directive as the only NOAA-developed recommended data server.

In other areas, we continued to excel in our science, build on a sustained history of successes and meet our mandates. In 2014 the SWFSC published more than 150 peer-reviewed primary journal articles, books and book chapters, Technical Memoranda, and International Whaling Commission (IWC) and Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) reports. We completed the 65th year of California Cooperative Oceanic Fisheries Investigation (CalCOFI), the 15th year of annual leatherback research in Monterey Bay, the 24th year of annual gray whale calf production survey, 35th year of quarterly California sea lion diet sampling, 44th year of marine mammal stranding data collection, the 31st year of rockfish surveys, among other sustained campaigns.

We published the 3rd Integrated Ecosystem Assessment of the California Current (CCIEA) and we continued to serve 100 Terabytes and 780 datasets through the ERDDAP. We successfully delivered nearly two-dozen stock assessments for species managed under the MSRA, MMPA and ESA, plus approximately one-dozen assessments of Antarctic stocks. Our methods reviewed well through external panels of experts such as STock Assessment Report (STAR) and Center for Independent Experts (CIE) panels, and we fulfilled our international commitments to CCAMLR, the International Scientific Committee (ISC), IWC, Inter-American Tropical Tuna Commission (IATTC) and other regional fisheries management organizations (RFMOs). We contributed to Biological Opinions, Biological Review/Status Review Teams, Take Reduction Teams, and Technical Review Teams, including those of several species of salmon. We continue to innovate and implement new methods in our genetic approaches to studying fish, marine mammals and turtles. We produced socioeconomic studies and reports addressing issues ranging from dam removals to the interaction of swordfish and fishing gears. We also maintained excellence in execution of over $50M annually in budgets, procurements and travel, and under difficult conditions we maintained uninterrupted high-level Information Technology protocols and standards. In sum, the SWFSC excelled in all the necessary ways that allowed our peers, constituents and collaborators to continue to look to and trust us to deliver the best science available for addressing important decision-making processes.

Budget Outlook

The Center's base budget in FY15 increased slightly from FY14, restoring some of the reduction in Pacific salmon funding and permanently filling existing NOAA Fisheries funds to fill critical gaps in Expand Annual Stock Assessments (EASA) and West Coast groundfish funding. The level of reimbursable funds in FY15 does not yet show an increase yet from FY14; however the final number will be higher due to increased external demand for Fishery Ecosystem Division (FED) science to support Central Valley salmon and other ESA salmon needs. Likewise, we expect total temporary funds in FY15 to be comparable to FY14 amounts.

Figure 1. SWFSC Permanent Base (blue), Temporary Base (green) and Reimbursable Funds (red) for FY08-FY15.

The funds we are allocated by NMFS are provided to the Center through specific PPA (Programs, Projects and Activities) categories – see Figure 2. The PPAs direct the funds to be used only for the purpose as described by the PPA. The funds' allocation process is one that typically takes into account what SWFSC received in the previous year and combines that with consideration of any increases or decreases Congress allocates to that line. Changes can be apportioned by NMFS to Regions and Centers equally. Often there is a specific plan worked out in advance with NMFS when budget changes occur. The NMFS Science Board is frequently engaged in budget discussions at both the planning and execution stages.

SWFSC by PPA (Program, Project, Activity)	FY 2015 YTD
Antarctic Research	$2,695,424
California Oceanic Cooperative Fisheries Investigation (Cal-COFI)	$1,274,593
Computer Hardware and Software - FY 2004 Omnibus Funded in PAC	$143,597
Dolphin Encirclement	$2,800,614
Dolphins/Yellowfin Tuna Research	$243,121
Economics & Social Sciences Research	$614,425
Endangered Species Act - Fish, Crustaceans, Mollusks	$375,783
Essential Fish Habitat (HAB)	$100,065

Expand Annual Stock Assessments - Improve Data Collection	$5,314,513
Fisheries Management Programs (EOP)	$9,036,359
Fisheries Statistics	$956,483
Habitat Conservation	$79,943
Information Analyses & Dissemination	$1,962,810
Integrated Ecosystem Assessments	$80,647
Marine Mammal Protection (MMP)/NMFS Activities	$609,624
Marine Mammals, Sea Turtles & Other Species/Endangered Species Act (ESA)	$1,226,091
National Cooperative Research	$777,474
Pacific Salmon - ESA Recovery and Research	$6,733,589
Product Quality and Safety	$752,015
Protected Species Stock Assessments and Mortality Estimation	$218,233
Recovery of Endangered Large Whales	$263,148
Sea Turtles – ESA	$1,742,747
West Coast Groundfish	$1,293,319
TOTAL	**$39,294,617**

Figure 2. FY15 Year-to-Date Allocation and FY16 Projected Budget.

Our FY16 budget situation will not be finalized until Congress passes a final budget. Nonetheless, an important early step in the appropriation process was the release of the President's budget request[ix] in early 2015. This year the request reflects the importance for NOAA Fisheries to continue improving our stock assessment capabilities and to implement electronic reporting and electronic monitoring in managed fisheries. For the West Coast, increases include modest increases in next generation stock assessments, ESA Pacific Salmon, and aquaculture. Congress holds the final decision on NOAA Fisheries budget and at the time of this AGM the House and Senate had not reached a resolution on funding executive agencies for the next fiscal year (FY16). There are differences between the budgets proposed by the House and Senate for the FY16 budget; therefore, it is prudent to be conservative and anticipate level funding or a 5% reduction from FY15 funding.

The SWFSC's FY16 projected allocation is based on FY15 and is shown in Figure 2. While the FY16 budget is not yet settled, we will continue to make calculated decisions regarding our programs. The cost of doing research continues to rise and budgets in many cases have remained flat or have only increased modestly. The budget situation is exacerbated by a shrinking work force (Figure 3 for a recent history) but vacancies will be filled in key areas, and we will manage budgets to allow the most flexibility possible.

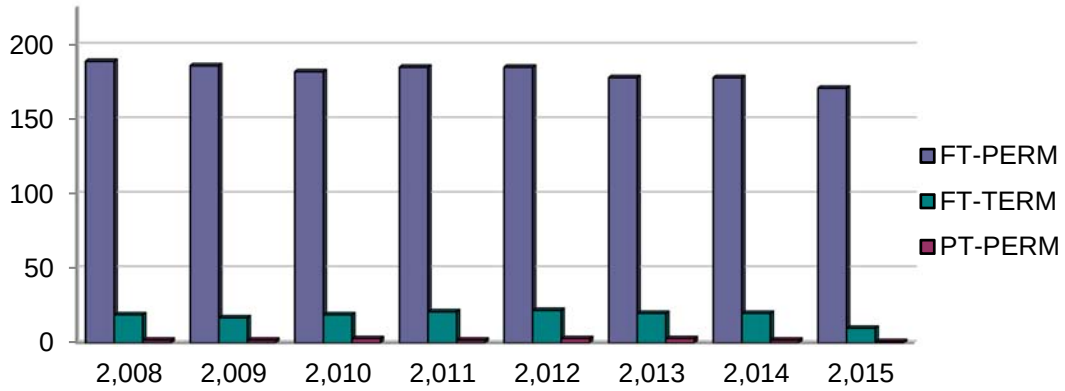

Figure 3. SWFSC staff (permanent, part time and term).

FY16 Priorities: Research, Collaboration, Partnerships and Infrastructure

In FY16 we will continue to build on our Strategic Science Plan's Core Research Themes (RTs). Research Themes are cross-divisional and were selected based on NOAA's stated priorities, our constituents' needs, and near-term opportunities. They are:

RT1. Population assessment: Provide assessments and management advice to rebuild and sustain fisheries, fishing communities, protected species, and their ecosystems

RT2. Ecosystem analysis: Assess and predict how environmental changes and human activities affect ecosystems and design and implement new management paradigms to manage fisheries and recover protected species

RT3. Observations, measurements and surveys: Provide information and data to support population assessments and analyses of ecosystem variability and change

RT4. Technological innovation and development: Improve ecosystem observations and survey methodologies through advanced technologies and sensor development

The following activities are the highest funding priorities for the SWFSC in FY16 and must be properly resourced to meet regional and national needs. In some cases accomplishing these activities will require a commitment to securing needed resources, while others will require a change in how we do business. Exclusion from this list does not mean an activity will not be funded, but rather this list includes the highest priorities. We list emerging priorities below by activities within Divisions (alphabetically), but reiterate that many of these activities require cross-divisional coordination.

Antarctic Ecosystem Research Division (AERD)

In FY16, AERD will focus on conducting science that is relevant to the management of the Antarctic krill fishery in the region surrounding the Antarctic Peninsula. The Division will complete the 5th winter U.S. AMLR survey in FY16. Completion of this survey will mark the

end of the AERD's first stanza of winter ecosystem studies and comprise the longest time-series record of such studies in the Antarctic. (RT3)

AERD will develop a plan to move forward in its research at sea over the next five years (FY17-FY21) and integrate the data from its 5-yr series of winter cruises into a stock assessment of krill. We plan to have this assessment reviewed by the Center for Independent Experts. (RT1, RT3)

The AERD will also continue its existing, long-term monitoring of krill-dependent predators in FY16 and expand this monitoring effort using remote, autonomous camera systems. The data collected from these cameras will be used to develop candidate decision rules for how the locations or quantities of krill taken by the krill fishery might be adjusted in response to observed indices of predator success. These candidate decision rules will be presented to CCAMLR's Working Group on Ecosystem Monitoring and Management. (RT2, RT3, RT4)

Beyond the krill-centric ecosystem around the Antarctic Peninsula, the AERD will also initiate a new program of research to study the movements of Antarctic toothfish in the Ross Sea. This research is intended to elucidate patterns and rates of movement of toothfish along the continental slope, into and out of areas that are currently closed to fishing. The research will demonstrate that non-lethal methods can be used to improve knowledge about toothfish. (RT3, RT4)

Environmental Research Division (ERD)

ERD's Climate and Ecosystem Program will continue investigating and analyzing environmental variability and ecosystem response, and the Data Integration and Analysis Program, in conjunction with the closely aligned CoastWatch West Coast Regional Node, will continue expanding data aggregation and serving. (RT2, RT3)

The Climate and Ecosystem Program's foci will continue the development of the California Current Integrated Ecosystem Assessment (CCIEA) indicators, a dynamic website for the CalCOFI annual *"State of the California Current"* report, offering the NOAA satellite oceanography class for training federal employees on using satellite data for research and monitoring, and the WhaleWatch modeling of blue whale habitat in the California Current. It will also develop Dynamic Ocean Management strategies for the California Drift Gillnet fishery, quantify bluefin tuna habitat (presence / absence and spawning) in the Gulf of Mexico and eastern Pacific, and investigate the drivers and controls on upwelling variability. (RT2, RT3)

The Data Integration and Analysis Program will also contribute to the satellite class, CCIEA and CalCOFI, especially through the development of dynamic web pages. Additional new hi-res satellite datasets will be served through ERD data services, as will more NOAA and NMFS survey and tag data. (RT2, RT3)

Improvements will be made to the suite of tools being developed to directly access ERD data services from within applications and development will continue on ERDDAP to improve the range of data and data services that ERDDAP can work with, and to evolve with updated data

standards. The CoastWatch web pages and browsers will undergo a complete overhaul. (RT3)

ERD will continue collaborations both within and outside of NOAA on standards for data content and services, and will provide advanced, interactive web pages for several collaborative projects, including salmon recovery, IEAs and the Animal Tracking Network (ATN). (RT3)

Data sets served through ERD's data services, whether ERDDAP or CoastWatch, are fully compliant with the Public Access to Research Records (PARR) directive. ERD will stand ready to support the Center's and NMFS' evolving needs with respect to PARR in FY16 through expanded use of the ERDDAP tools.

Fisheries Ecosystem Division (FED)

FED has a broad slate of ongoing projects and activities that will continue. Here, we highlight emerging challenges and opportunities that we intend to tackle in FY16.

Among the endangered species NMFS has prioritized for focused recovery efforts through its Species in the Spotlight campaign two are Central California Coast coho salmon and Sacramento River winter-run Chinook salmon. We will seek opportunities to increase our attention to these species, to support recovery efforts of the WCRO and other partners.

The north Pacific has been experiencing unusual warming due to changes in wind patterns, creating extremely warm and dry conditions in coastal watersheds. We will continue, and expand where possible, our efforts to supply information and tools to support management of anadromous species impacted by the severe drought, and expand our efforts to understand the underlying mechanisms of the climate anomaly and its impact on ecosystems and human communities. (RT2)

Should NOAA's *"Ecosystem-based Solutions for Coastal Resilience"* initiative receive Congressional support, we will work with partners to enhance coastal habitat assessments and use the resulting information to improve abundance indices of managed fish stocks. We will also attempt to increase our support of the Russian River Habitat Focus area by supplying decision support tools. (RT1, RT2)

FED will complete 5-year status reviews of threatened and endangered salmonids, in collaboration with the WCRO and NWFSC, and fishery stock assessments of Klamath and Sacramento River fall Chinook. With pending WCRO support, we will develop a new forecast model for winter-run Chinook to support water and fishery management, and use it to evaluate new fishery control rules for winter-run Chinook that incorporate prospective information on cohort condition. (RT1)

FED will complete the annual juvenile rockfish recruitment survey, monthly sampling along the Trinidad Head line, and investigate the feasibility of sampling salmon on sardine and hake cruises. FED will also begin annual monitoring of the abundance of green sturgeon in the

Sacramento River using imaging sonar, and deploy a pilot PIT tag detection system in the Sacramento-San Joaquin system. (RT3)

Fisheries Resources Division (FRD)

FRD will support the PFMC and International Regional Fisheries Organizations by conducting stock assessments on Coastal Pelagic Species (CPS), concentrating on species that have not been assessed recently, including jack mackerel. The longer-term goal is to assess the forage base in the California Current including market squid and krill. For Highly Migratory Species, Pacific Bluefin tuna will undergo a full assessment in 2016 under the auspices of the ISC. FRD will continue working on a Management Strategy Evaluation (MSE) for North Pacific Albacore, which will be formally assessed by the ISC in 2017. (RT1)

FRD will provide survey and monitoring information for the NOAA Fisheries Science Review Program, which will examine the Center's research on climate and ecosystem science. (RT3)

FRD will continue to explore physical and environmental correlates of habitats for a range of commercially-important and bycatch species in the West Coast swordfish fishery to determine if there are common indices that may help distinguish swordfish and bycatch habitat and alternative gear types that will more efficiently reduce bycatch and lead to a more productive and sustainable fishery. (RT2)

Spring 2016 will be the first opportunity that FRD will use the new *FSV Reuben Lasker*, with its full suite of new acoustic sonar systems to survey CPS. The 2016 Sardine-Hake (SaKe) research cruise in the summer of 2016, in collaboration with the NWFSC, will concentrate of research in refining the SaKe survey techniques for assessing CPS and Hake including new technology to sample the nearshore areas (potentially using UASs and UAVs) where large research vessels cannot go. It will also be the first opportunity to collaborate with Mexico on a synoptic acoustic cruise that extends along the entire west coast of North America. (RT3, RT4)

FRD will continue to work closely with its commercial and recreational constituents to provide for sustainable and economically viable fisheries. This includes several post-release survivorship studies on a range of species. (RT1)

FRD will also continue life history studies of CPS and HMS in support of stock assessments including age and growth studies, tagging, foraging ecology, stock structure and reproductive biology studies on a range of species. Additional work will be conducted on environmental and oceanographic bounds in collaboration with PICES to enhance our understanding of the dynamics of pelagic fishes, including Bluefin tuna under climate and environmental changes. (RT1, RT2)

Marine Mammal and Turtle Division (MMTD)

In FY16 we will strategically focus on understanding how the recent (and unprecedented) changes in physical conditions have affected our trust species in the California Current through: (i) continuation of the current Collaborative Large Whale Survey, (ii) a possible repeat

of the California Current Cetacean & Ecosystem Assessment Survey (CalCURCEAS), (iii) a possible process study of loggerhead turtles in the southern portion of the current, and (iv) diet sampling of California sea lions. Biological changes in the California Current are also associated with recovering populations and MMTD will continue to conduct risk assessments associated with anthropogenic impacts on these populations, and to study the role of top-down forcing by the ocean's top-top predators in the context of recovering large whale populations and climate change. (RT1, RT2)

MMTD will continue to use and develop new technologies to sample individual animals with less invasive methods and to scale data from individuals up to the population level, in particular through use of UAS platforms, thermal sensors, passive acoustics, and animal-borne instruments, and through maximizing the information obtained from pencil eraser-sized tissue samples to clarify stock structure and understand vital rates (through molecular genetics and stable isotopes), health and reproductive condition (through hormone assays and photogrammetry), and trophic position (through stable isotopes). (RT4)

MMTD will hold the line on maintenance of our long time series, including our abundance and trends time series for cetaceans and pinnipeds in the California Current, gray whale population abundance and calf production, and health and condition of cetaceans as assessed through our stranding response and necropsy work. (RT3)

Mexican scientists will undertake a survey of vaquita in the northern Gulf of California in the fall of 2015 and MMTD scientists will participate. This survey will provide an abundance estimate of this endangered marine mammal species and enable planning for recovery strategies.

Organizational Excellence

The Operations and Management Division will focus on maintaining dedicated and knowledgeable technical and support staff for our main operational and administrative functions. In addition to maintaining core staff for budget, procurement, facilities, property, HR, travel, safety and other functions, O&M will contribute to shaping new NMFS approaches to addressing key areas of organizational risk and respond to requests for information from HQ. O&M will continue to take the lead on developing content for the Center's new Intranet project in FY16.

Information Technology Services will also maintain their high levels of customer service to the Center. In addition, they will contribute substantively to meeting the Center's requirements for the new Presidential Directive on Public Access to Research Results. ITS will continue as the technical lead on the Center's Intranet project, and will continue projects to increase network security and improve connectivity in FY16.

Annual Science Plan Implementation Process – The Future

During 2014-5, SWFSC leadership worked to establish a foundation for future strategic planning and implementation. This included designing and populating a database version of

our Activities Spreadsheet, which is being used to assess research activities across the Center and initiate research prioritization. This will position us to take an approach to implementation that meets regional and national needs, maintains or improves necessary infrastructure and support services, and aligns our workforce capabilities with strategic priorities in the Focus and Core Research mission areas. Our implementation process is evolving and will continue to mature over the next few years. The goal is to conduct programmatic planning that is more transparent to staff, agency leadership, and constituents.

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[i] http://swfsc.noaa.gov/uploadedFiles/Home/SWFSCStratSciencePlan-2013.pdf

[ii] http://home.nmfs.noaa.gov/organization/snippets/noaa_fisheries_priorities_2014_v2.pdf

[iii] https://swfsc.noaa.gov/uploadedFiles/Home/SWFSC_AGM_28Mar2014.pdf

[iv] The forecast for the El Niño for 2015-16 has been forecast to be "strong": http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.html

[v] http://www.washingtonpost.com/blogs/capital-weather-gang/wp/2014/11/04/in-the-red-west-coast-waters-are-warmest-in-decades-what-does-it-mean/; http://www.eurekalert.org/pub_releases/2015-03/nfwc-wcw031615.php; http://www.utsandiego.com/news/2014/dec/29/scripps-ocean-starr-voyage-whales-dolphins-current/; and http://www.nytimes.com/2015/03/18/us/as-california-drought-enters-4th-year-conservation-efforts-and-worries-increase.html?emc=eta1&_r=0

[vi] https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=259&id=19382

[vii] http://www.noaa.gov/iea/CCIEA-Report/pdf/index.html

[viii] http://www.state.gov/r/pa/prs/ps/2012/09/197817.htm

[ix] https://www.whitehouse.gov/sites/default/files/omb/budget/fy2016/assets/budget.pdf